THE ADVANTAGES AND METHOD OF WATERING MEADOWS BY ART.

THE SECOND EDITION,

WITH TWO DESCRIPTIVE PLATES;

AND WITH

OCCASIONAL EXTRACTS AND REMARKS

UPON

WIMPEY, FORBES, BOSWELL,

AND OTHER WRITERS ON THIS SUBJECT.

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ORIGIN OF WATERING.

TO the queſtions that have been propoſed to me reſpecting the origin of watering meadows *by art*, it is not in my power to give any preciſe and determinate anſwer. Tradition however ſays, that it has been practiſed in this county for almoſt a century; and the oldeſt people, with whom I have converſed upon the ſubject, tell me, that one Welladviſe, an opulent farmer of South-Cerney, was the firſt that ever attempted any thing of the kind; and by this ſilly fancy, as it was called, he forfeited his honourable name, and received that of Madman; but fortunately, this unmerited diſtinc-

tion was as ſpeedily removed as it was raſhly confer'd. This reputed madman made his firſt experiment by cutting a large ditch into the middle of his ground, and ſo threw the water over it to flow in ſome parts, and to ſtagnate in others; which in fact was neither doing ſervice nor injury to the land, for the ſtagnation was as prejudicial to one part, as the running water was profitable to the other. Finding the reſult not adequate to his expectations, he improved his plan by cutting drains, and filling up all hollow places in his meadow, by which he made ſo great and ſo rapid a proficiency, that ſoon commanded not only the approbation, but likewiſe the imitation of all his neighbours who had any regard to their own intereſt.

Ever ſince this period have the inhabitants of this village enjoy'd (in their own imagination) the undiſputed honour of the invention of this moſt advantageous practice in agriculture. But this claim, laſt year, we were compell'd reluctantly to relinquiſh, on reading the following note

note in the Monthly Review for October, 1788, P. 384.

" We thank D. N. for his information con-
" cerning the antiquity of watering meadows in
" England, and particularly on the borders of
" Wales. The moſt ancient trace of the practice
" which he could diſcover in print, is in a book
" entitled, " *Water Workes*," written by Rowland
" Vaughan, who ſeems to have been the in-
" ventor of the art, and to have practiſed it
" in great perfection, and on a moſt extenſive
" ſcale, in the Golden Valley in Hereford-
" ſhire, during the reigns of queen Elizabeth,
" and king James the Firſt."

THE ADVANTAGES.

THE advantages ariſing from watering land, or throwing a thin ſheet of running water over its ſurface, are many and great. If it be well executed, I may freely venture to aſſert, that this mode of cultivation will be found more productive than any other modern improvement in agriculture. By it, land, of whatever kind or quality, is increaſed to double or treble its former value. And it does not derive this enriching power from the aſſiſtance or ſpoil of the neighbouring fields, but independently of all other things, diffuſes a general fertility. It does not rob the farm-yard of its Stores, nor even take back from the abundance which it there produces: for it ſtands in need of no dung, no expenſive preparation of manure or compoſt. So that the farmer who occupies fifty acres of this watered land has an hundred tons of

of hay to carry off and ſpend upon his other grounds. But it is not merely the *Crop* that conſtitutes the great excellence of watering; it is the *Earlineſs* and *Certainty* of that crop.

Of the great value of graſs very early in the ſpring every rational farmer is ſenſible; but rather let thoſe eſtimate it who have a large ſtock of cattle in the months of March and April, and have but little hay for their ſupport. By watering, we have plenty of graſs at the beginning of March, and when the ſeaſon is mild, ſomewhat earlier. And the good effects that this graſs has upon all kinds of cattle, more eſpecially thoſe that have been hardly wintered, is truly aſtoniſhing. And the farmers here are enabled to begin cheeſe-making, at leaſt a month ſooner than their neighbours who enjoy not the advantage of watering their land.

With reſpect to the nurture of lambs, the value of this graſs is ineſtimable: not only of thoſe

thoſe intended for fatting, but thoſe likewiſe deſigned for ſtore. For it is a truth well known, tho' not ſufficiently attended to, that if lambs in their early days are ſtinted and ſtopped in their growth, they receive from thence an unhappy contraction in their nature, which they not only retain for life, but in ſome meaſure communicate to their young. The early ſpring feed of theſe meadows is therefore moſt ſalutary and effectual in the prevention of this evil: and there is great reaſon to believe, that if the young of all kinds of Farmers Stock were immediately encouraged by a plenitude of food, and continually kept in a growing ſtate, we ſhould in a few years ſee a noble change both in the ſize and ſhape of cattle in general.

With regard to the *Certainty of a Crop*, I need not ſay much, the thing will ſpeak for itſelf. Between March and May we are ſure of Spring-feed worth at leaſt a Guinea *per* acre; in June we have a crop of graſs that will yield two tons of hay *per* acre; and the after-math is always worth

worth a pound. Let the ſummer be ever ſo dry, we are fortunate enough to have nearly the ſame quantity. Indeed after the laſt dry ſummer, the advantage of watering was abundantly evident; for the neighbouring hill-farmers were obliged to have recourſe to the watered meadows, to purchaſe hay at four pounds *per* ton, or at whatever price the owners thought proper to demand.

Other advantages there are which ought not to be paſſed over unnoticed. The land thus treated is continually improving, tho' it is mown every year; its herbage, if coarſe, is fined; its ſoil, if ſwampy, becomes ſound; and an addition is made annually both to the depth and quality of its mould. "To theſe advanta-
"ges (ſays Mr. Boſwell in his copious treatiſe
"on this ſubject) another may be addreſſed to
"the gentleman who wiſhes to improve his
"eſtate, and whoſe benevolent heart prompts
"him to extend a charitable hand to the relief
"of the induſtrious poor, and not to idleneſs

" and vice; almoſt the whole of the expences in
" this mode of cultivation is the actual manual
" labour of a claſs of people, who have no
" genius to employ their bodily ſtrength other-
" ways, for theirs and their families ſupport,
" conſequently viewed in this light, the ex-
" pences can be comparatively but ſmall, the
" improvement great and valuable."

As a kind of proof of ſome of the above aſſer-tions, I ſhall juſt mention the product of one of our meadows laſt year. It is one that has been watered longer than the memory of the oldeſt man in the pariſh, but is by no means the beſt meadow upon the ſtream, nor was the preced-ing winter favourable for watering. It contains ſix acres and a half. The ſpring-feed was let for ſeven guineas, and well ſupported near two hundred ſheep from the firſt of March 'till the beginning of May: the hay was ſold for thirty two guineas, and the after-math for ſix. But I have lately been informed of a ſtill more re-markable proof of the happy effect of this prac-tice.

tice. About five years ago, two of our moſt ſkilful watermen were ſent for to lay out a meadow of ſeven acres, whoſe whole crop of hay that year was ſold for ſo ſmall a ſum as two pounds. It was eſteemed by many an impoſſibility to throw the water over it, but they ſoon effected it; and ever ſince that time the meadow has been let at the annual immenſe rent of three pounds an acre.

Thus encouraged by experience, this practice is become ſo prevalent with us, that the moſt ſimple ſpring or rivulet is never ſuffered to paſs unnoticed and unſtrained. Even wherever a ſudden ſhower uſually occaſions a temporary flood, there proper ditches are made to receive the water, and ſpread it equally over the land, 'till it is completely drained of every particle of its fertilizing contents. Neceſſity indeed compels us to make the moſt of every drop, for we have near three hundred acres in this pariſh that muſt all, if poſſible, be watered, and the ſtream that muſt afford the water ſeldom exceeds five

yards in width and one in depth. Therefore I may ſay, that a ſcarcity of water is almoſt as much dreaded by us, as by the celebrated inhabitants of the banks of the Nile.

All the above advantages, and ſtill greater, I am convinced might be reaped by many other people in the kingdom, provided they were acquainted with, and would attempt the following method. I mean to ſay this of ſuch lands only as are ſituated near a ſtream that is ſometimes thick or muddy; for if the water be always pure and ſimple, the effect will be by no means equal to the above. We have an inſtance of this in two of our meadows which are watered immediately from ſprings that riſe in the grounds themſelves. The crops of theſe meadows are early and plentiful, but not of a good quality; and the ſoil, having little ſediment left upon it, remains unimproved after many years watering. But even in this caſe, be the water ever ſo clear, this practice is not unworthy of attention; for the water of moſt copious ſprings brings with it

a degree

a degree of warmth, as it is termed, that is proof againſt the froſt, and has a good effect upon the firſt meadow that uſes it. It keeps the land completely warm and ſheltered from cutting winds, and the graſs is continually growing in the ſeverity of winter. But this effect in a great meaſure ceaſes when the water is uſed a ſecond time, for when it has been ſpread in a thin ſheet over the ſurface of a meadow, it will afterwards freeze as ſoon as rain-water.

I cannot diſmiſs this head without introducing, by way of confirmation, the opinion of men of judgment and real conſequence.

The Analytical Reviewers, in their very zealous and cogent recommendation of *Watering*, ſpeak thus. "To our certain knowledge, "many, very many ſtreams, which might be "the means of diſſeminating abundance to the "fields upon their borders, are now ſuffered to "run to waſte, and we conſider every moment "that things are allowed to remain in this ſtate,

as

" as the loſs of a treaſure more precious than
" gold itſelf. Having ourſelves experienced
" the benefit of this practice, in a diſtrict far
" diſtant from Glouceſterſhire, we can atteſt,
" that we have ſeen effects reſulting from it
" much greater than thoſe which have been
" ſpecified to have ariſen from it in that county.
" Watering in a ſhort time will convert the
" thickeſt heath into the cloſeſt pile of graſs,
" and the barren ſoil, on which no kind of grain
" could have been made to grow, will thus be
" made to yield the moſt luxuriant crops of
" corn as well as graſs."

The Monthly Reviewers likewiſe have repeatedly and moſt ſtrenuouſly recommended this practice, which, they ſay, they know from experience to be well deſerving the attention of the public.

Mr. Forbes likewiſe, who has written a very valuable treatiſe, entitled *Modern Improvements in Agriculture*, ſays, " Some have been ſo ſen-
" ſible

" ſible of the advantage of watering land, as to
" employ windmills, pumps, and other engines
" for this purpoſe, particularly that known by
" the name of Archimedes's ſcrew; and in
" ſome circumſtances the advantage is ſo great
" as to anſwer the expence of raiſing the water
" in this manner."

And, " ſhould there, ſays Blythe, happen to
" be a quantity of land that comes under this
" deſcription, (capable of being watered) not
" one moment's heſitation ſhould be made
" about the ſucceſs, for the advantage is the
" greateſt that can be obtained by any mode
" of huſbandry, with the leaſt expence, and the
" greateſt degree of certainty."

With this ſtrong evidence in its favour, ſtrange it ſeems that this practice has not already become general in the kingdom. For there is no ſtream or river in the kingdom, on which a mill is or can be erected, but what may be made very enriching to a certain quantity, perhaps a large tract, of land.

I am

I am confident, that there are, in each county of England and Wales, two thouſand acres, upon an average, which might be thus treated, and every acre encreaſed at leaſt one pound in annual value. The general adoption therefore of watering is capable of being made a national advantage of more than one hundred thouſand pounds *per* annum, beſides the great improvement of other land, ariſing from the produce of the meadows, and the employ of thouſands of induſtrious poor. Such an improvement, one would think, is not unworthy public notice; but if I had doubled the ſum, I believe I ſhould not have exceeded the truth, tho' I might have gone beyond the bounds of general credibility. In this one pariſh, where I reſide, there are about three hundred acres now watered, and it might eaſily be proved, that the proprietors of the land reap from thence a thouſand pounds actual profit yearly.

I am happy in conjecturing, that the time is not very diſtant when watered meadows will be

viewed

viewed with admiration in every county of Great-Britain; for within this half year I have been highly gratified in receiving applications from ſeveral gentlemen of very extenſive property, and have ſent experienced men into diſtant counties, to lay out meadows of this kind, which muſt prove a recommendation of the practice, far more ſtriking and effectual than words or books can poſſibly be.

THE METHOD.

BEFORE we proceed to the particulars of the method of watering, theſe three things are neceſſary to be conſidered. Will the ſtream of water that you mean to uſe admit of a temporary wear or dam acroſs it? Can you dam up and raiſe the water a few inches higher than your meadow, without flooding and injuring your neighbour's land? And can you draw the water off your meadow as quick as it is brought on? If you are free from all objections of this kind, you may proceed in the following manner.

Having taken an accurate level of your ground, and compared it with that of the river, as near the dam as you can, (ſee plate 1. A. W.) cut a deep wide ditch, or the maſter work, and by it convey the water directly to the higheſt part of the meadow, keeping the

ſides

ſides or banks of the ditch of an equal heighth, and about three inches higher than the general ſurface of your meadow. In a large meadow, with an uneven ſurface, (ſee plate 2) ſometimes three works are neceſſary in different directions, each five feet wide, if the meadow contains fifteen acres, and if the higheſt part of it be the fartheſt from the ſtream. In general, a ditch of ten feet wide and three deep will water ten acres of land. When there are three works in a meadow, and flood-hatches at the mouth of each, when the water is not ſufficient to afford a complete covering for the whole at once; it may be watered at three different times, by taking out one of the hatches, and keeping the other two in. In this caſe, when the water has run over one diviſion of the land for ten days, it may then be taken off that, and turned over another, by taking up another hatch, and letting down the firſt; and thus the three diviſions may enjoy the water alternately, and each reap equal benefit. The bottom of the firſt work, or maſter-feeder, ought to be as deep as the bot-

tom of the river, when the fall in the meadow will admit of it; for the deeper you draw the water, the more mud it carries along with it. From the works, cut, at right angles, ſmaller ditches, or troughs, their width proportioned to the diſtance to which ſome part of the water is to be carried, and their diſtance from each other to be about twelve yards. A trough of two feet wide and one deep will water a ſurface of twelve yards wide and forty long. In each trough as well as work, place frequent ſtops or obſtructions, eſpecially when the water is rapid, to keep it high enough to flow through the notches, (or what we improperly call ſluices,) or over the ſides. The width of each work and trough is gradually contracted, as the quantity of water is continually decreaſing the farther they proceed. Between every two troughs, parallel to and equidiſtant from each, cut a drain as deep as you pleaſe, and wide enough to receive all the water that runs over the two adjoining beds, and to carry it off into the maſter-drain with ſuch currency as to keep the whole

whole ſheet of water in conſtant motion, and, if poſſible, not to ſuffer one drop to ſtagnate upon the whole meadow. For a ſtagnation, (tho' it is recommended by a Mr. D. Young, for the improvement of arable land) is what we never admit in our ſyſtem of watering, for we find that it rots the turf, ſoaks into and ſtarves the land, and produces nothing but coarſe graſs, or aquatic weeds.

When a meadow lies cold, flat, and ſwampy, the width of the bed, or the diſtance between trough and drain, ought to be very ſmall, never exceeding ſix yards; indeed in this caſe you can ſcarcely cut your land too much, provided water be plentiful, for the more you cut, the more water you require. The fall of the bed (ſee plate 1, fig. 2.) in every meadow, ſhould be half an inch in a foot, leſs will do, but more is deſirable; for when the draught is quick, the herbage is always fine and ſweet. The water ought never to flow more than two inches

deep,

deep, nor leſs than one inch, except in the warm months.

The Analytical Reviewers ſeem to think that the Glouceſterſhire farmers uſe more water than is neceſſary. To this I anſwer, that when water is plentiful, our farmers find it advantageous, in the beginning of Winter, to uſe even more than I have ſpecified, and when it is ſcarce, they chuſe to water only one half, or a leſs portion of a meadow at a time, and to give that a good covering, rather than afford a ſcanty one to the whole.

The Reviewers likewiſe recommend a repeated uſe of the ſame water upon different and lower parts of the ſame meadow, or to make each drain ſerve as a trough to the bed that is below it. This is a method which, tho' I am told it is in ſome meaſure adopted by the celebrated Mr. Bakewell, and taught by a ſyſtematical waterer in Staffordſhire, I will venture to condemn, except when the great declivity of the

the land will admit of no other plan. This cannot be a proper mode of watering graſs-land in the winter, for it can be of no ſervice to the loweſt parts of the meadow, unleſs as a wetting in Spring or Summer. The firſt or higheſt bed of a meadow laid out according to this plan, will indeed be much improved, the ſecond may reap ſome benefit, but the third which receives the exauſted, thin, cold water, will produce a very unprofitable crop. Our farmers never chuſe more than a ſecond uſe in the ſame meadow, and that very ſeldom. They call even the ſecond running by the ſignificant name of ſmall-beer, which, they ſay, may poſſibly ſatisfy thirſt, but can give very little life or ſtrength to the land. It is a much better method to have a meadow laid out ſo as to be watered at ſeveral times, and to be at the expence of ſeveral ſmall flood-hatches, than to water the whole at once by means of catch-drains. One of our watermen laid out a meadow laſt year for Lord Talbot, at Rugely

in

in Staffordſhire, which, I am confident, will ſoon diſcountenance the preſent plan of watering in that county.

Sometimes it is neceſſary in a large meadow to convey the water that has been uſed under the works and troughs, and then the water above is ſupported by means of boards and planks, which we call a carry-bridge. Sometimes, the better to regulate the courſe of the water on the ſurface, eſpecially in the Spring, narrow trenches are dug, and the mould laid by the ſide of them, in order to be reſtored to its former place when watering is finiſhed. The earth and mud thrown out in cleanſing and paring the ditches ſhould be carried to fill up the low, hollow parts of the meadow, and be trodden down with an even ſurface, which will eaſily be done when the water is on, the workman being always provided with a ſtrong pair of water-proof boots. If the mould thus uſed has upon it a turf that is tolerably fine, place it uppermoſt, but if it is ſedgy and coarſe,

turn

turn it under, and the water, if it runs quick, will ſoon produce upon it a fine herbage.

The grounds that are watered in the eaſieſt and moſt effectual manner, are ſuch as have been plowed, and ridged up in lands of about twelve yards wide; here the water is eaſily carried along the ridge by means of a ſmall ditch or trough cut along its ſummit, and then by means of the ſtops it is made to run down the ſides or beds into the furrows, by which it is carried into the maſter-drain, which empties itſelf into the river. Every meadow, before it is well watered, muſt be brought into a form ſomething reſembling a field that has been thus left by the plow in a ridged ſtate.

Mr. Wimpey ſays, "a water-meadow is laid "out in arched lands ſimilar to the ſegment of "a circle;" but he ſhould rather have ſaid, that each ſide of the land ought to be, as nearly as poſſible, a perfect, inclined plane, that the

water may flow down with the greater eaſe and quickneſs.

The ſtructure of flood-hatches is ſo ſimple, and ſo well underſtood by every common carpenter, that it may be deemed unneceſſary to inſert a deſcription. One hint however may not be improper, that their baſis ſhould be deep and firmly fixed, and well ſecured with ſtone and clay, to prevent its being blown up by the force of the water.

DIRECTIONS FOR EACH MONTH OF WATERING.

AT the beginning of November, each work, trough, and drain, ſhould be well cleanſed, by the ſpade and breaſt-plow, of weeds, graſs, and mud, and well repaired, if they have received injury from the feet of cattle. Then take the firſt opportunity after a ſhower, when the water is thick and muddy, of turning over your meadow almoſt as much water as you can, without injuring the banks of the works, eſpecially if the land be poor. In this month the water contains much more ſalts and richneſs than later in winter.

" This poſition," the Monthly Reviewers ſay, " is a doubtful one;" and likewiſe aſſert, " that many practical waterers will be of opi-

" nion that the *muddineſs* of the water is of little " conſequence."

As this comes from men of ſcience, whoſe opinion is eagerly caught at and embraced by the public, and conſequently, if it ſhould prove erroneous, is the more apt to miſlead, the reader will pardon me if I take up ſome pages in endeavouring to ſubſtantiate what I have aſſerted, eſpecially as I ſhall have a fair opportunity of introducing ſome moſt valuable remarks of Wimpey and Forbes upon this head. That water at the beginning of November contains much more ſalts and richneſs than later in Winter, I ſtill reſolutely contend, tho' I am not able to prove it by any chymical analyſis; for it ſeems to me evident, after the firſt waſhing of farm-yards, various ſinks, ditches, and the ſurface of all the adjoining fields which have lain dry for ſome time, that the common ſtream ſhould then contain much more fatneſs than when the ſame premiſes have been repeatedly waſhed. This our farmers boldly aſſert from many

many years experience. If they can, at this ſeaſon, obtain plenty of muddy water for one week, they eſteem it of equal value with that of the whole winter following. But I ſhall not reſt my argument on my own, or the authority of farmers, but ſhall take the liberty of introducing a powerful advocate, Mr. Forbes, who in mentioning the ſubject of watering, in his treatiſe, ſpeaks thus to the point. P. 141.

" The water ſhould be let in upon the " meadow in November, when the firſt great " rains make the river muddy, for then it is full " of a rich ſediment brought down lands of the " country thro' which it runs, and is waſhed " into it by the rain, and as the ſediment " brought by the firſt floods is the richeſt, the " carriages and drains of the meadow ſhould " all be ſcoured clean and in order before theſe " floods come."

In oppoſition to the opinion of "practical " waterers, that the muddineſs of the water is

of

of little conſequence," I will not heſitate to affirm, that the mud is of as much conſequence in winter-watering, as dung is in the improvement of a poor upland field. For each meadow in this neighbourhood is fruitful in proportion to the quantity of mud which it collects from the water. And indeed, what manure can be conceived more enriching than the abundant particles of putrid matter which float in the water, and are diſtributed over the ſurface of the land, and applied home to the roots of the graſs. It is true, that any the moſt ſimple water thrown over a meadow in a proper quantity, and not ſuffered to ſtagnate, will ſhelter it in Winter, and in the warmth of Spring will force a crop, but this unuſual force muſt exhauſt the ſtrength of the land, which will require an annual ſupply of manure in ſubſtance, or in a courſe of years the ſoil will be impaired rather than improved. The meadows in this county which lie next below a market-town, or village, are invariably the beſt, and thoſe which receive the water after it has been uſed two or three times, reap

proportionably

proportionably leſs benefit from it. For every meadow that is well laid out, and has any quantity of graſs upon its ſurface, will act as a fine ſieve upon the water, which, tho' it flow in ever ſo muddy, will be returned back to the ſtream as clear as it came from its fountain. This circumſtance, when there is a range of meadows to be watered, the property of different perſons, when water is ſcarce, creates vehement contentions and ſtruggles for the firſt uſe; therefore the proprietors are compell'd to agree amongſt themſelves, either to have the firſt uſe alternately, or for the higher meadows to dam up and uſe only one half or a leſs portion of the river. Our farmers know the mud to be of ſo much conſequence in watering, that whenever they find it collected at the bottom of the river, or the ditches, they hire men whole days to diſturb and raiſe it with rakes made for the purpoſe, that it may be carried down by the water, and ſpread upon their meadows. We have one meadow in this pariſh which, I think, is an inconteſtible proof of the conſequence of muddy

muddy water: — it is watered by a branch of the common ſtream that runs for about half a mile down a public road: — this water, by the mud on the road being continually diſturbed by carriages and the feet of cattle, becomes very thick, and when it enters the meadow is almoſt as white as milk. This Field, which conſiſts of ſeven acres, was, a few years ago, let at ten ſhillings *per* acre, but is already become the richeſt land in the pariſh, and has produced, at one crop, eighteen loads of hay, and each load more than twenty-five hundred weight.

If, however, the above aſſertions ſhould appear inconcluſive, I have it in my power to introduce authorities in my favour, which, I doubt not, muſt force conviction.

Mr. Wimpey, a man who in all his agricultural treatiſes diſcovers not only real erudition and practical knowledge, but a true philoſophical *acumen*, in a letter inſerted in the twenty-eighth number of the annals of agriculture, writes thus.

" As

" As to the ſorts of water, little is to be
" found, I believe, which does not encourage
" and promote vegetation, even the moſt ſim-
" ple, elementary, uncompounded fluid : —
" heat, and moiſture, as well as air, are the
" *ſine quâ non* of vegetation as well as animal
" life. Different plants require different pro-
" portions of each to live and flouriſh ; but
" ſome of each is abſolutely neceſſary to all.
" However, experience as well as reaſon uni-
" verſally ſhews, that the more turbid, fecu-
" lent, and replete with putreſcent matter the
" water is, the more rich and fertilizing it
" proves. Haſty and impetuous rains, of con-
" tinuance ſufficient to produce a flood, not
" only diſſolve the ſalts, but waſh the manure
" in ſubſtance off the circumjacent lands into
" the rapid current. Such turbid water is
" both meat and drink to the land, and by
" the unctuous ſediment and mud it depoſits,
" the ſoil is amazingly enriched and improved.
" The virtue of water from a ſpring, if at all
" ſuperiour to pure elementary water, is de-

" rived from the ſeveral ſtrata or beds of earth " it paſſes thro', that according to the nature of " ſuch ſtrata, it may be friendly or otherwiſe " to vegetation. If it paſſes thro' chalk, marle, " foſſil, ſhells, or any thing of a calcareous " nature, it would in moſt ſoils promote the " growth of plants; but if thro' metallic ore, " or earth impregnated with the vitriolic acid, " it would render the land unfertile, if not " wholly barren. In general, the water that " has ran far * is ſuperiour to that which im- " mediately flows from the ſpring, and more " eſpecially that which is feculent and muddy, " conſiſting chiefly of putrid animal ſubſtances " waſhed down the ſtream."

Mr. Forbes, alſo, confirms the above in the following words. " There is great difference " in the quality of water, ariſing from the par- " ticles of different kinds of matter mixed with " them. Thoſe rivers that have a long courſe

* This (ſays Mr. A. Young, in a note) is a point of great importance. See Prieſtly on air, vol. 5. p. 31. A. Y.

" thro'

" thro' good land, are full of fine particles,
" that are highly fertilizing to the adjoining
" meadows that are caſually overflowed by
" them; and this chiefly in floods, when the
" water is fulleſt of a rich ſediment: for when
" the water is clear, tho' it may be raiſed by
" art high enough to overflow the adjoining
" lands, and be of ſome ſervice to them, the
" improvement thus made is far ſhort of what
" is obtained from the ſame water when it is
" thick and muddy."

Mr. Boſwell, likewiſe, is of the ſame opinion. " From Michaelmas to Candlemas, " ſays he, " great attention ſhould be given to all
" floods that may happen, whether from heavy
" rains or the melting of ſnow, ice, &c. never
" to let any paſs unregarded, but all the wears,
" ſluices, &c. ſhould be opened, and as much
" of the land as poſſible be flooded with it;
" theſe waters are always thick and rich, being
" the waſhing of all the country. A few days
" therefore of ſuch water is invaluable."

In December and January, the chief care conſiſts in keeping the land ſheltered, by the water, from the ſeverity of froſty nights. It is neceſſary, however, thro' the whole winter, every ten days or fortnight, to give the land air for a few days, by taking the water off entirely, otherwiſe it would rot and deſtroy the roots of the graſs. It is neceſſary, likewiſe, that a proper perſon ſhould go over every meadow at leaſt twice every week, to ſee that the water is equally diſtributed, and to remove all obſtructions ariſing from the continual influx of weeds, leaves, ſticks, and the like.

In February, a great deal depends upon care and caution. If you now ſuffer the water to remain on the meadow for many days without intermiſſion, a white ſcum is raiſed, very deſtructive to the graſs; and if you take off the water, and expoſe the land to a ſevere froſty night, without its being previouſly dried for a whole day, the greateſt part of the tender graſs will be cut off. The only ways to avoid both

theſe injuries are, either to take the water off by day, to prevent the ſcum, and to turn it over again at night, to guard againſt the froſt; or, if this practice be too troubleſome, you may prevent both, by taking the water off entirely for a few days and nights, provided the firſt day of taking off be a dry one; for if the graſs experience one fine drying day, the froſt at night can do little or no injury. The ſcum is generated chiefly by the warmth of the ſun, when the water is thin, and uſed too plentifully. Towards the middle of this month, we vary our practice in watering, by uſing only about half the quantity of water which we do earlier in winter; we now rather only *wet* than *water* the land. At this ſeaſon, the method (which I have noticed above) of uſing repeatedly the ſame water, will prove nearly as efficacious as that adopted in this county; for all that is now required, is to keep the land in a warm humid ſtate, and to force vegetation.

At the beginning of March, the crop of graſs in

in the meadows is generally ſufficient to afford an abundant paſturage to all kinds of ſtock, and the water is taken off for near a week, that the land may become dry and firm, before the heavy cattle are turned in. It is proper, the firſt week of eating off the ſpring-feed, if the ſeaſon be cold, to give the cattle a little hay each night.

It is a cuſtom, I am told, with ſome farmers in Hampſhire, to eat off the ſpring-graſs of their meadows with ewes and lambs, in the ſame manner that we do a field of turnips, by incloſing a certain portion each day with hurdles or flakes, and giving them hay at the ſame time. This is certainly making the moſt of the graſs, and an excellent method to fine and ſweeten the future herbage. In this month and April, you may eat the graſs as ſhort and cloſe as you pleaſe, but never later; for if you treſpaſs only one week upon the month of May, the hay-crop will be very much impaired, the graſs will become ſoft

and

and woolly, and have more the appearance and quality of latter-math than of a firſt crop.

At the beginning of May, or when ſpring-feeding is finiſhed, the water is again uſed for a few days, by way of a wetting.

" About a week, ſays Mr. Boſwell, before " the graſs is to be mown, let the water into it " for about twenty-four hours, it will make the " ground moiſt at the bottom; the ſithe will go " thro' it the eaſier, and it will be mown the " cloſer for it." This practice, tho' it may prevail in Dorſetſhire, is very ſeldom adviſable, for the following reaſons: Water made to run thro' a thick crop of graſs, tho' it appear ever ſo pure, will leave a certain quantity of adherent ſcum or ſediment, which can never be ſeparated from the hay, but will render it unpalatable, if not prejudicial, to the cattle that are to eat it. And this wetting of the land and graſs will impede the drying or making of the hay, perhaps ſome days, which, in difficult ſeaſons, is of very great

great conſequence: And it will likewiſe make the turf too ſoft and tender to ſupport the wheels of a loaded waggon in carrying off the hay. Beſides, I have reaſon to believe, that one day's wetting in the ſummer, will, upon moſt meadows, endanger the ſoundneſs of every ſheep that feeds upon the after-math.

It is rather remarkable, that watering in autumn, winter, or ſpring, will not produce that kind of herbage which is the cauſe of the rot in ſheep, but has been known to remove that cauſe from meadows which before had that baneful effect. If, however, you uſe the water only a few days in any of the ſummer months, all the land thus watered will be rendered unſafe for the paſturage of ſheep. This I had frequently been told, but did not give it credit till laſt ſummer, when I had an opportunity of ſeeing an experiment made by a friend. At the beginning of July, when the hay was carried off, and the water rendered extremely muddy and abundant, by ſeveral days heavy rain, he thought

thought proper to throw it over his meadow for ten days, in which time a large collection of extremely rich manure was made upon the land. In about a month the meadow was covered with an uncommon luxuriancy and blackneſs of herbage. Into this graſs eight ſound young ewes, and two lambs, were turned to depaſture. In ſix weeks afterwards the lambs were killed, and diſcovered ſtrong ſymptoms of rottenneſs; and in about a month afterwards one of the ewes was kill'd, and tho' it proved very fat, its liver was putrid, and replete with the inſect called the Fluke, or Weevil: the other ewes were ſold to a butcher, and all proved unſound.

The above experiment, however, convinces me, by the very extraordinary improvement made thereby in the meadow, that muddy water in the Summer is much more enriching than it is in Autumn or Winter, and ought to be uſed, for a week at leaſt, every wet Summer, notwithſtanding its inconvenience to ſheep, the moſt profitable ſpecies of ſtock.

ANSWERS TO OBJECTIONS.

WHEN a meadow is firſt prepared for watering, by cutting of various works, ditches, and drains, they who are as yet unacquainted with the practice, immediately exclaim, that the land is entirely cut to pieces, waſted, and ſpoil'd. But it may be anſwered, that if even one fourth of a meadow is conſumed by ditches, and the remaining parts produce three times the crop which the whole land before produced, certainly there is no room for complaint.

A ſecond objection is the expence of laying out a meadow, which indeed, in ſome ſituations, is very conſiderable; but the future expences bear no proportion to the increaſed value of the land. The common charge of our watermen who go out to give directions, is a guinea a week.

Another

Another objection is, that the hay of watered meadows is by no means equal in value to upland hay; but this, if it be ſometimes true, is not the fault of the land, but the occupier: for moſt farmers, large in their deſires, when they obſerve, in the month of June, ſo ſtrong an inclination in their graſs to grow and increaſe, think it a pity to check this inclination, and prevent the increaſe, 'till at length they have a crop of nearly three tons upon an acre, and the hay is almoſt as long, coarſe, and dry, as wheat-ſtraw. Thoſe farmers, however, who are wiſe enough to be content with a ton and a half upon an acre, have hay of a quality very little inferior to the beſt upland hay. This I know from experience.

The Critical Reviewers, in their publication for the month of January, 1789, noting my former edition, make the following objection to watering. "In clayey grounds, particularly "a cold, ſtiff clay, we have found it injurious; "and this exception our author ſhould have

" pointed out." This exception, I muſt take the liberty of ſaying, it certainly was not my duty to point out; for I did not know of any ſuch exception, nor do I allow that any ſuch can exiſt under a proper management of the water. For the ſoil of a great part of many of our beſt meadows is a ſtiff, cold clay, and the clayey part of each is (*cæteris paribus*) always more fertile than any other. Indeed, what ſoil can be found ſo grateful, ſo retentive of manure, and ſo invariable in its productions, as a cold clay, properly drained?

There is, however, another objection, and with us a very weighty one, and that is, paying the millers for the uſe of the water. We have one meadow of ſixteen acres which pays ſix guineas yearly for the water. This muſt, of courſe, reduce very much the value of the land; but if the owner can afford to pay ſo much for the water, it is a very convincing proof of the ſuperiour utility and excellence of this mode of cultivation.

If,

If, in the above deſcription, I am not found ſufficiently clear and particular, I ſhall not only think it my duty, but ſhall be happy to anſwer any queſtions reſpecting this buſineſs (as far as I am able) that may be propoſed by letter, (addreſſed to me at South-Cerney, near Cirenceſter, Glouceſterſhire,) or otherwiſe. As, however, it is almoſt impoſſible to deſcribe fully in words, or by plates, a method which muſt vary, as the ſituation of every meadow is different; the beſt and cheapeſt way is to ſend for one of our watermen, who, without taking any level, can immediately diſcover whether watering be practicable or not, and if it be, will undertake at a moderate rate.

EXPLANATION

EXPLANATION OF THE PLATES.

Plate I. repreſents a meadow with an even ſurface.

A. Is the dam in the river, conſiſting of three hatches.

B. The flood-hatches at the mouth of the work, thro' which the meadow may be watered at pleaſure.

W. The maſter-work, or feeder.

D. The maſter-drain.

d. One of the ſmall drains, which extends to the feeder, and by which, when its mouth is opened, and the hatches let down, the whole meadow may be laid dry almoſt inſtantaneouſly, when occaſion require.

T. One of the troughs which branch from the work, and diſtribute the water.

S. One of the ſtops which obſtruct the courſe of the water in the works and troughs,

and

and keep it high enough to flow through the notches, or ſmall apertures, made purpoſely in the ſides of them.

Figure 2. is intended to repreſent the profile, or elevation, of two lands in a watered meadow.

Plate II. repreſents a meadow with a very uneven ſurface.

A. Is a large ditch, cut deep enough to receive the water, without a dam in the river, at a diſtant and higher part of the ſtream, by which means the water gains ſeveral inches of fall, and the current is the quicker upon the meadow.

W. 1. Is the maſter work which waters the higheſt and moſt diſtant part of the land.

W. 2. Is the diagonal work which waters an eminence in the middle of the meadow.

W. 3. Is a ſmaller work, which waters a lower part adjoining the river.

d. The

d. The ſmall drain, which has immediate communication with one of the works, as in Plate I.

THE END.

Plate. 1.

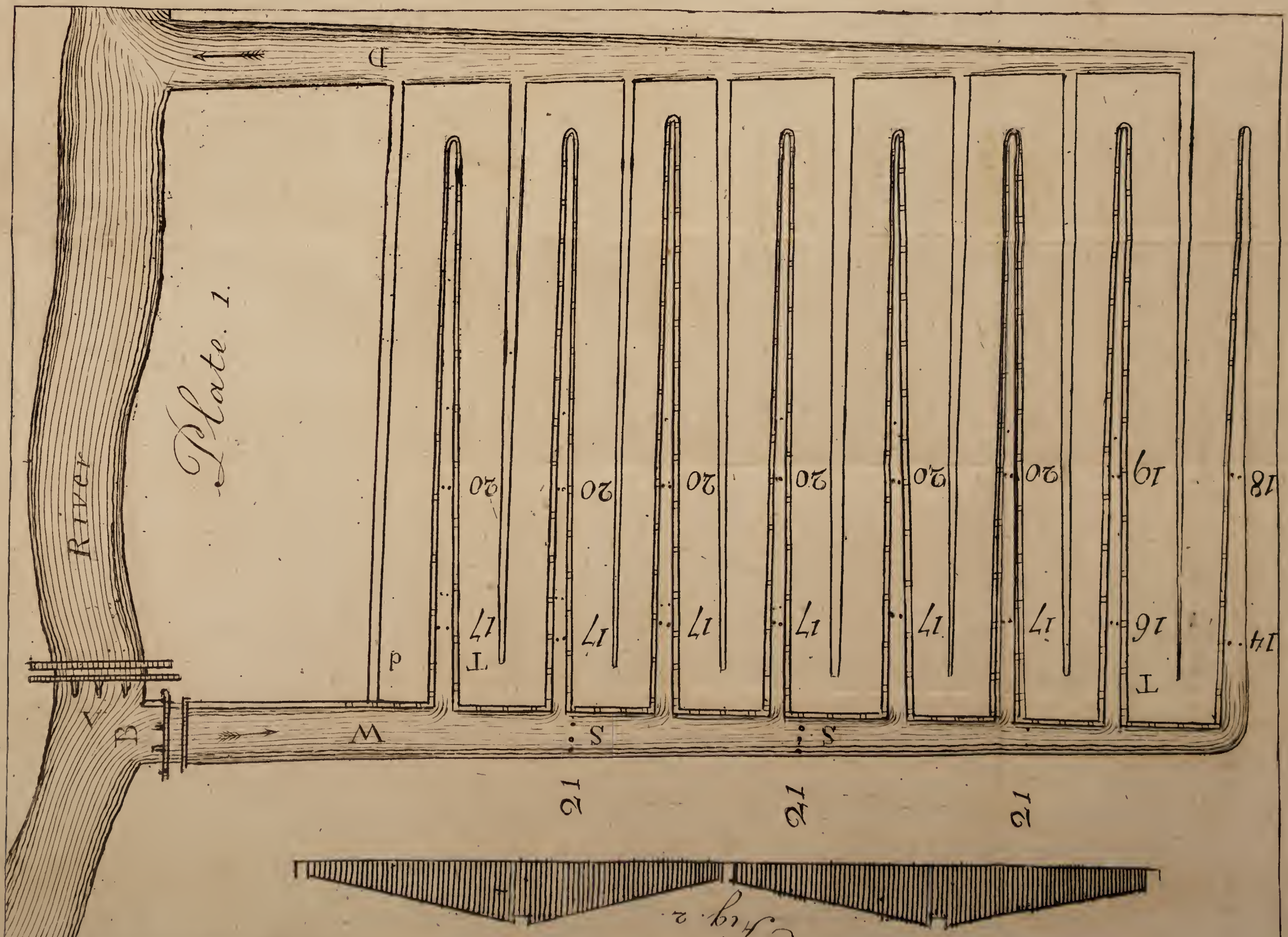
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Fig. 2.

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Plate. 2.

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W 3

W 2

W 1

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D

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